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evidences of the care taken by the author to prevent errors on the part of the student, and, with the detailed methods of procedure described in the introductory chapters, it would seem as though everything had been done to enable the student to fit himself to identify minerals by all means except those based on their optical behavior in polarized light.

A chapter has been introduced into this edition treating of the crystal forms of minerals in a manner especially adapted to beginners. The treatment is necessarily brief as regards the principles of crystallography. Particular stress has been put upon the illustration of the subject. The number of figures is not only large as compared with the extent of the text, but care has been taken to employ examples most likely to be met with by the student, and the drawing of the figures has been well done. The method of treatment is mainly descriptive, and, though conceptions of symmetry are introduced, and excellent figures representing the relative positions of different axes of symmetry are given in connection with various subdivisions of crystal forms, the application of symmetry to the forms or its relation to them is left to the student to work out. The arrangement of the groups or systems of crystal forms is that ordinarily followed, beginning with those having the most complex symmetry, holohedral isometric crystals, and finishing with crystals without symmetry, the triclinic. Subdivisions of each of these systems are called normal, when holohedral according to former usage, and when having less symmetry than the highest in each system, that is, when belonging to what have been called hemihedral or tetartohedral, they are named after some characteristic crystal form or after some mineral characterized by such a form.

In all parts of the book there are evidences of the great care taken by the author to render the subject intelligible to persons taking up the study of minerals for the first time, and there can be no question as to the success of the endeavor.

J. P. I.

The Lower Cretaceous Gryphæas of the Texas Region. By ROBERT THOMAS HILL and THOMAS WAYLAND VAUGHAN. Bulletin No. 151, U. S. G. S. Washington, D. C.

The bulletin presents a careful study of that group of fossil oysters which has generally been referred to *Gryphæa pitcheri* of Morton. The authors vigorously criticise the opinions and descriptions formerly

published, and dwell with laudable earnestness upon the confusion resulting from carelessness and from opinions based upon inadequate investigation. The great variability of the *Ostreidæ* is emphasized, but the authors correct the opinion previously held that this variability destroys their value in stratigraphy. They show that the hemeræ of many forms have well defined limits and are, therefore, of the greatest use in determining horizons. No classification yet given is satisfactory for the Texas *Ostreidæ*. The forms are tabulated provisionally under the old familiar names.

After this discussion, which deals in some measure with the family in general, the authors confine their attention to the specific object of the paper. The various forms which have been referred to *Gryphæa bitcheri* are discussed from a historical standpoint and their stratigraphic and geographic distribution noted. The species of the group are specifically defined and many data given regarding their development and methods of growth, and lastly, something of their phylogeny. A large part of the bulletin is taken up with plates showing the various species at different stages of growth and the individual shells in different positions. The figures formerly published are also reproduced for comparison. The work is especially commendable for careful investigation and clear-cut presentation.

W. T. LEE.

Le Granit des Pyrénées et ses phénomènes de contact—Premier memoir: Les contacts de la Haute-Ariège, par M. A. LACROIX, Professeur de Minéralogie au Mus. d'Hist. Nat. Bull. des serv. de la carte géol. de la France. No. 64, tome X. Paris, 1898.

The area which has furnished the results published by M. Lacroix in this bulletin is situated in the very mountainous southern tract of the Departement of the Ariège, about 100^{km} southeast by south of the city of Toulouse. The Ariège, one of the head waters of the Garonne, flows through the region. Most emphasis is laid on the phenomena of contact exhibited on the right bank of the stream, since the exposures are considerably more accessible and continuous than on the left bank. The facts of observation on both banks are, however, accordant.

This, the first memoir on the granite massifs of the Pyrénées, is devoted to a purely mineralogical treatment of igneous contacts, which